

UCN-BL

USER MANUAL



**INSTALLATION, USE AND MAINTENANCE
MANUAL**

UCN-BL
MIEN021-00

First edition (May 2006)

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General Terms & Conditions

1. The following terms and conditions apply to the sale of machinery, components and related services and products, of C.D.R. Pompe S.p.A. (hereinafter "the products")
2. C.D.R. Pompe S.p.A. (the manufacturer) warrants only that:
 - a.) its products as being free of defects in material, design and workmanship at the time of original purchase;
 - b.) its products will function in accordance with CDR Pompe S.p.A. operative manuals; CDR Pompe S.p.A. does not guarantee that the product will meet the precise needs of the Customer, except for those purposes set out in any invitation to render documents or other documents specifically made available to CDR Pompe S.p.A. before entering into this agreement;
 - c.) high quality materials are used in the construction of the pumps and that machining and assembly are carried out to the highest standards.

Except as expressly stated above, CDR Pompe S.p.A. makes no warranties, express or implied, concerning the products, including all warranties of fitness for a particular purpose.

3. This warranty shall not be applicable in circumstances other than defects in material, design, and workmanship. In particular warranty shall not cover the following:
 - a.) Periodic checks, maintenance, repair and replacement of parts due to normal wear and tear (seals, O-rings, rubber items, bushings, etc.);
 - b.) Damage to the product resulting from:
 - b.1.) Tampering with, abuse or misuse, including but not limited to failure to use the product for its normal purposes as stated at the time of purchase or in accordance with CDR Pompe S.p.A. instructions for use and maintenance of the product, or the installation or improper ventilation or use of the product in a manner inconsistent with the technical or safety standard in force;
 - b.2.) Repairs performed by non skilled personell or use of non original CDR parts.
 - b.3.) Accidents, acts of God or any cause beyond the control of CDR Pompe S.p.A., including but not limited to lightning, water, fire, earthquake, and public disturbances, etc.;
4. The warrantee shall cover the replacement or repairing of any parts, which is documentedly faulty due to construction or assembling, with new or repaired parts free of charges delivered by C.D.R. Pompe S.p.A. Parts subjected to normal tear and wear shall not be covered by the warranty. CDR Pompe S.p.A shall decide as to whether the defective or faulty part shall be replaced or repaired.
5. The warrantee of the products shall be valid for a period in accordance to the current law from the date of delivery, under the condition that notice of the alleged defect to the products or parts thereof be given to CDR Pompe S.p.A. in written within the mandatory term of 8 days from the discovery.
6. Repair or replacement under the terms of this warranty shall not give a right to an extension to, or a new commencement of, the period of warranty. Repair or replacement under the terms of this warranty may be fulfilled with functionally equivalent reconditioned units. CDR Pompe S.p.A. qualified personnel shall be solely entitled to carry out repair or replacement of faulty parts after careful examination of the pump. Replaced faulty parts or components will become the property of CDR Pompe S.p.A.
7. The products are built in accordance with standard CE normative and are tested (where applicable) by C.D.R. Pompe S.p.A. Approval and tests by other control authority are for the customer's account. The products shall not be considered defective in materials, design or workmanship if they need to be adapted, changed or adjusted to conform to national or local technical or safety standards in force in any Country other than that for which the unit was originally designed and manufactured. This warranty shall not reimburse such adaptations, changes or adjustments, or attempt to do so, whether properly performed or not, nor any damage resulting from them, nor any adaptation, change or adjustments to upgrade the products from their normal purpose as described in the products operative manual without the prior written consent of CDR Pompe S.p.A.
8. Installation, including electric and other connections to utility mains according to C.D.R. Pompe S.p.A. drawings, is for the cost and responsibility of the customer, unless otherwise agreed in writing.
9. CDR Pompe S.p.A. will not be liable on any claim, whether in contract, tort, or otherwise, for any indirect, special, incidental, or consequential damages, caused to the customer or to third parties, including loss of profits, arising by any possible infringement of par. 3 above or by the customer or third parties being in the impossibility of using the products. Steady the above, CDR Pompe S.p.A. liability to the customer or third parties from any claim, whether in contract, tort, or otherwise, shall be limited to the total amount paid by the customer for the product that caused the damages.
10. This agreement shall be interpreted, construed and governed by the Italian law. Any dispute arising out of or in connection with this agreement shall be submitted to the exclusive jurisdiction of the Court of Milan.

1 General Information

1.1 Introduction

This manual refers to single-stage, centrifugal, mechanical seal pumps model **UCN-BL**, in close-coupled execution according to DIN 24256 and ISO 2858 standards.

C.D.R. Pompe S.p.A. would like to thank you for choosing our products.

We believe that with a correct installation and proper use of this product you will achieve the best results, therefore please read this manual carefully before undertaking any operation on the pump-motor unit.

Any use other than that described herein is considered incorrect and therefore C.D.R. Pompe S.p.A. shall not be held responsible for any damages to people or things.

In case of doubt or enquiries, please apply to our technical service directly at the following address:

CDR Pompe S.p.A.
Via P. Togliatti 26/a
I-20030 Senago, MI
Tel. +39 02 990 1941
Fax +39 02 998 0606
www.cdrpompe.com
info@cdrpompe.com

1.2 Purpose of the Manual

This manual supplies the user of the pump-motor unit manufactured by C.D.R. Pompe S.p.A. the necessary information for the correct installation, use and maintenance in compliance with safety conditions prescribed by the current CE standards.

1.3 Application Fields

The centrifugal pumps, in close-coupled execution, with mechanical seal model **UCN-BL** are designed to transfer a variety of different liquids with temperature ranging, viscosity and maximum system pressure specified on chapter 9.

Such figures however depend on the size of the pump, the type of materials used and the pumped liquid.

The UCN-BL pumps **do not** have Self-Priming capabilities.

The operating conditions and hence the proper working range for which the pump and its components have been selected, are described in the technical sheet released with the order.


Should you need to change the type of service for which the pump has been selected and purchased, please contact C.D.R. Pompe S.p.A.'s technical service before any change is applied. The user is responsible for any damage caused to person or property if such damage is determined by non-compliance with the operating conditions agreed at the time of the Order Confirmation and the information contained in this manual.

It is also Customer's responsibility to:

- Verify the suitability of the pump-motor unit to the working environment
- Provide operators with proper protection and safety devices.
- Provide operators/users with complete information concerning proper use and functioning of the pump.

1.4 Copyright

Il presente manuale è di proprietà della C.D.R. Pompe S.p.A., che si riserva il diritto di modificarne il contenuto senza preavviso. Esso contiene informazioni tecniche e disegni di proprietà della C.D.R. Pompe S.p.A. e non può essere quindi, in nessun caso, riprodotto in toto o in parte senza previa autorizzazione scritta della C.D.R. Pompe S.p.A. stessa.

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The name **ILS[™]** is registered Trademark and Trade Name of C.D.R. Pompe S.p.A.

1.5 Pump Identification

Each pump is provided with a data plate containing the following information:

- 1- Pump model
- 2- Serial No.
- 3- Item (when requested)
- 4- Capacity
- 5- Head
- 6- Material in contact with liquid
- 7- Impeller diameter

For applications with Ex-proof requirements, an additional label is placed on the pump. On the label you will find the following information:

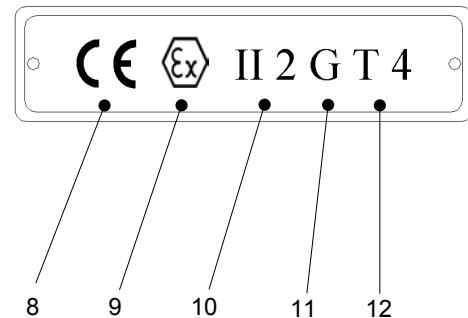
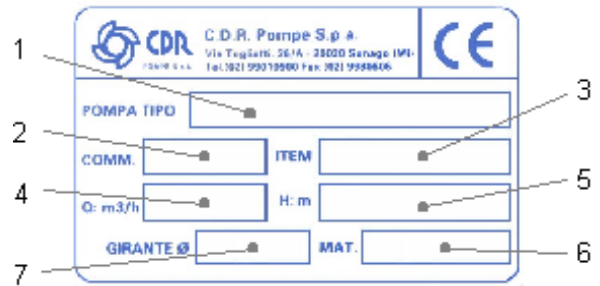
- 8 CE logo
- 9 Ex protection Logo
- 10 Equipment Group
- 11 Explosive Atmosphere class:
G = Gas

12 Temperature class:

The maximum effective surface temperature depends above all from the operative conditions of the process liquid of the user (UNI EN 13463-1 art.6.1.3).

When requesting spare parts, assistance or information concerning the pump supplied, the serial number must be always provided.

Please make sure to have the serial number handy before contacting CDR Pompe S.p.A. service.







2 Safety

2.1 Introduction

This manual contains all the information needed for the correct installation, use and maintenance of your new CDR pump. It should be read and understood by all the personnel involved in installation, operating and servicing of the pump before it is started.

2.2 Symbols and signs

	WARNING: Indicates an operation that requires extreme care.
	DANGER: POWER SUPPLY Possible danger caused by the presence of electric fields or live wires.
	DANGER MAGNETIC FIELD Indicates the presence of high intensity magnetic fields.
	GENERAL DANGER: Potential source of danger for whoever working on the pump unit.

Non-compliance with safety instructions described herein can be a source of danger for people, the environment and the machine, and voids any right to make claims to C.D.R. Pompe S.p.A.

The limits provided in this manual or in any documents provided with your pump must never be exceeded.

Do not start nor execute running tests before filling the pump with liquid.

2.3 Operator qualification and training

The personnel in charge of the installation, the operation and maintenance of the pump unit we produce must be qualified and able to perform the operations described in this manual.

C.D.R. Pompe S.p.A. shall not be held responsible for the training level of personnel and for the fact that they are not fully aware of the contents of this manual.

2.4 Safety Instructions



FOR YOUR OWN SAFETY:



BEFORE UNDERTAKING ANY SERVICE OPERATION ON YOUR PUMPS, PLEASE MAKE SURE TO WEAR THE PROPER PROTECTIVE GEAR



Do not perform any maintenance operation on the pump while it is running or before it has been disconnected from the power supply.

Always disconnect the unit.



Avoid any possible hazard that might be caused by electric power (for details see current regulations in force).

Check the electrical specifications on the motor data plate and make sure they correspond to the power supply to which it will be connected.



Avoid pumping liquids, even at different times, that may cause chemical reactions.

Always clean the pump thoroughly before changing liquid.



Mag-Drive pumps use wide range, high intensity magnets.

All pacemaker carriers must not approach magnetic components; intense magnetic fields can disturb heart pace.

The cold or hot parts of the pump unit must be protected to avoid accidental contacts.

We remind you that the maximum effective surface temperature depends above all from the operative conditions of the process liquid of the user (UNI EN 13463-1 art.6.1.3).

Do not tamper with the protection of the rotating parts, do not touch or approach rotating parts while running.



Always avoid the dry operation of the pump.

Start the pump when it is completely filled and with the delivery valve almost closed, limiting this condition to the time that is strictly necessary to start the pump.

It is not recommended to use liquid with suspended solids, especially if sensitive to magnetism.

In case dirty liquids are to be pumped and this was not mentioned at the time of ordering, it is necessary

to contact C.D.R. Pompe S.p.A.'s technical service before activating the pump.
Do not submit pumps to abrupt temperature variations.



Clean the pump before performing service on it!

Corrosive and dangerous liquids contained in the pump could present a threat to your safety!



After service, start the pump again following all the safety instructions described in chapter 6 "Starting and stopping".

2.5 Noise Level

UCN-BL pumps, including the motor, in normal operating conditions (Q opt) produce a sound level below 80 dBA.

The major sources of noise are: liquid turbulence in the plant, cavitation or any other abnormal operation that does not depend from the pump construction nor the pump manufacturer. The user must provide suitable protective means if the sources of noise could produce a harmful noise level for operators and for the environment (in compliance with current regulations).

2.6 Modifications and Spare parts

Any changes concerning the service of the pump as originally purchased, can be executed only after written approval from C.D.R. Pompe S.p.A.
It is recommended to use only genuine CDR spare parts and approved accessories. The use of non-original spare parts or non approved accessories will void warranty and removes any responsibility on our behalf for any damage caused to people or things.

2.7 Safety in explosive environments

It is user's responsibility, when ordering the pump, to verify that the fluid temperature is suitable for the classification zone of the plant. *We remind you that the maximum effective surface temperature depends above all from the operative conditions of the process liquid of the user (UNI EN 13463-1 art.6.1.3).*

UCN-BL pumps are built in accordance with 94/9/CE – ATEX Group II, class 2G standards. The maximum operating temperature allowed for this pump model is 120°C.
The user must verify and insure that such temperature limits are not exceeded.

Grounding

The pump motor unit a base-plate are provided with separate grounding to prevent electrostatic load formation.

Their positioning is marked through international symbols.

Motor

When the motor is purchased separately from the pump, please make sure it does meet the protection parameters specified for the application area indicated by the Customer/User.

It is the user's responsibility to grant that the pumps operating limits are strictly observed.

If this cannot be granted, it is the user's responsibility to use proper devices in order to make sure that the pump remains within the given parameters.

Recommended Options:

The user has to make sure that the pump units operating limits are observed. A most important issue is the operating temperature. If the user cannot grant the operating temperature is kept within the limits, he shall use appropriate control devices.

Wattmetric Units

Will stop the pump in case of dry running conditions or overloads due to:

- accidental closing of the discharge / suction valve
- changing in liquid properties due to temperature variations

2.8 Mechanical seal



The max permitted operating limits of the respective seal type size must be observed by all means.

The material combination of the mechanical seal as well as the physical and thermal parameters of the process, quench, or barrier fluid have a major influence on the operating limits.

The correct selection of the appropriate seal arrangement is of vital importance for an faultless operation.

The seal arrangements mostly used are various single or dual seal arrangements. Refer also to e.g. ISO 5199.

Further additional measures are flushing or thermal barriers (e.g. cooling flange, cooling housing) integrated in the equipment.

Regarding a seal selection by media please refer to CDR sales staff.

The generated heat of the mechanical seal has to be dissipated to the medium to be sealed or the barrier fluid, e.g. by means of a circulation or cooling , to avoid that the seal is overheated.

A possible failure of a mechanical seal, if used in accordance with the specified operating conditions, is indicated by a considerable increase of the leakage as compared to the normal average leakage. A regular monitoring of the leakage is recommended.

The user has to take care that the permitted operating limits are observed and not exceeded.

The user (employer) has to observe EC guide line 1999/92/EG (ATEX 137).

The directive includes minimum requirements regarding:

- an improved health protection and.
- the safety of the employees.

who might be endangered by potentially explosive atmospheres.

2.9 Lubrication

The design of machines in which mechanical seals are applied has to be such to ensure that there is always a sufficient quantity of lubricant available.

If using liquid-lubricated seals on the atmosphere side media containing a high percentage of gas should not be sealed.

It is of vital importance that the seal chamber, supply systems, and the machine are constantly filled with process medium, quench, or barrier fluid.

If the user is not able to ensure this suitable monitoring measures have to be applied by all means (e.g. measurement of level, pressure, and/or flow rate).

Continuous monitoring or appropriate checks or inspections are possible.

Dry-run in will cause a prompt temperature rise of the mechanical seal, resulting in a complete failure, endangering personnel and environment.

2.10 Temperature limits

The max. permitted limits of the seal type/size used must be observed by all means.

- seal arrangement
- design
- sliding material combination
- as well as the secondary sealing elements, and the physical and thermal parameters of process, quench, or barrier medium have a major influence on the max. temperature limits.

The permitted operating temperature of process, quench, or barrier medium has to be below the max. surface temperature specified by the prescribed temperature class in accordance with the respective mode of operation.

Special attention has to be paid to the temperature difference between specified temperature class and operating temperature of the process medium at the outboard mechanical seal.

Media with poor lubricating properties and/or media with a low specific thermal capacity are responsible for a relatively high temperature increase at the sliding face.

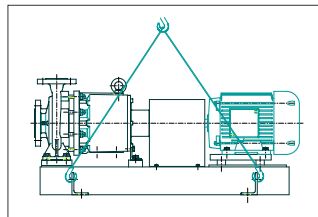
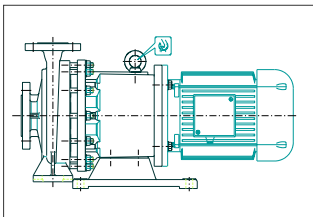
On principle, the user of the equipment has to ensure that the permitted operating temperature of the process medium is observed.

If the user is not able to ensure this suitable measures have to be applied to prevent a temperature increase above the max. surface temperature.

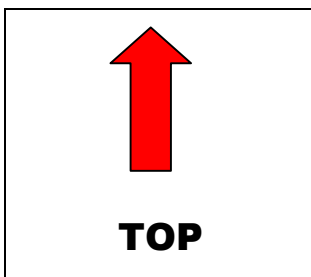
3 Packaging & Handling

3.1 Packaging

C.D.R. Pompe S.p.A. pumps or pumping units are normally packed either in cartons (maximum dimensions 800x600x400mm) held in place by foam, or fixed on pallets and wrapped with plastic film. In case of pumps ordered without electric motor, they are packed with the external magnetic core loose, which is kept in the packaging, separated from the pump and protected with foam/padding. Special packaging according to customer's request are available on demand to suit the type and means of transport. Packaging must be opened and handled according to the instructions shown on it.



To ensure that the crate, cartons or pallets are handled and lifted properly, read the symbols on the package (see the following legend).



3.2 Shipping and Receiving

The goods we deliver undergo a control procedure and are approved before being released. It is, however, recommended to verify your incoming packages. The contents of each package are described in the packing-list or in the delivery note. Run your check list carefully at the time of collection and possibly with the driver/carrier on site, check the integrity of the goods and packaging. Any claim must be made immediately by notifying the carriers and have them to sign the claim. In addition, check that the material received meets the order specifications (number and type of goods).

3.3 Handling



To move cartons, crates or pallets weighing more than 20Kg, use a suitable means for the weight shown on the shipping document and always wear proper safety garments and gear. After un-crating your pump, always use hoist eyebolts, when available.

Close-coupled pumps, especially those with ADPE (Eex-D) motors could have unbalanced masses on the hoist fittings, therefore you should handle the units with all the necessary care. While moving the unit, avoid any impact that may damage the pump or the electric motor. When lifting, fasten the crate as shown.

3.4 Storage



In case of storage, the pump must be placed in a dry, covered place and stored in its original packaging or equivalent protection.

The protecting caps and lids must be kept on the pump flanges until it is installed.

If the pump needs to be stored for long periods and/or in particularly severe environmental conditions, it is recommended to seal the pump packaging and use some hygroscopic substance (silica gel) to prevent moist damages.

4 Structural Description

4.1 Description

The **UCN-BL** is a centrifugal, single-stage mechanical seal pump. It is available both in close coupled execution. The external parts are made of metallic material -Cast Iron- painted with one coat of epoxy varnish (dry thickness 60 µm) and two coats of polyurethane enamel RAL 1017 (dry thickness 50 µm). Different painting coats or different finishing colours must be requested prior to ordering.

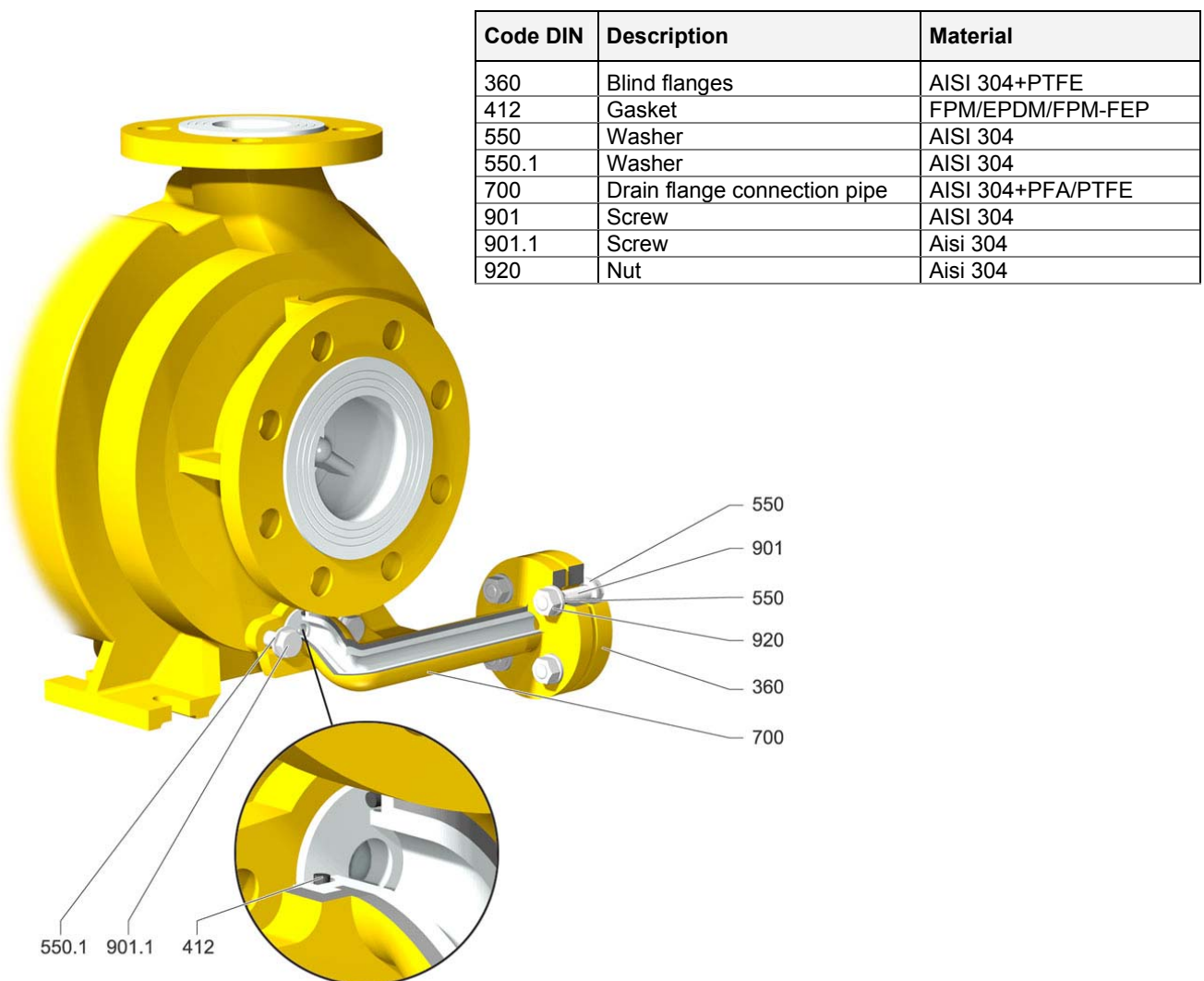
The parts in contact with the pumped liquid are made of thermoplastic material, either PP or PFA. The pump casing (lining) is manufactured with a

particular moulding technology, called "transfer", that allows to mould the corrosion resistant layer directly on the metallic shell, providing optimal grip on the metallic shell.

4.2 Available option

The standard available option for this pump type is :

- pump casing with flanged drain



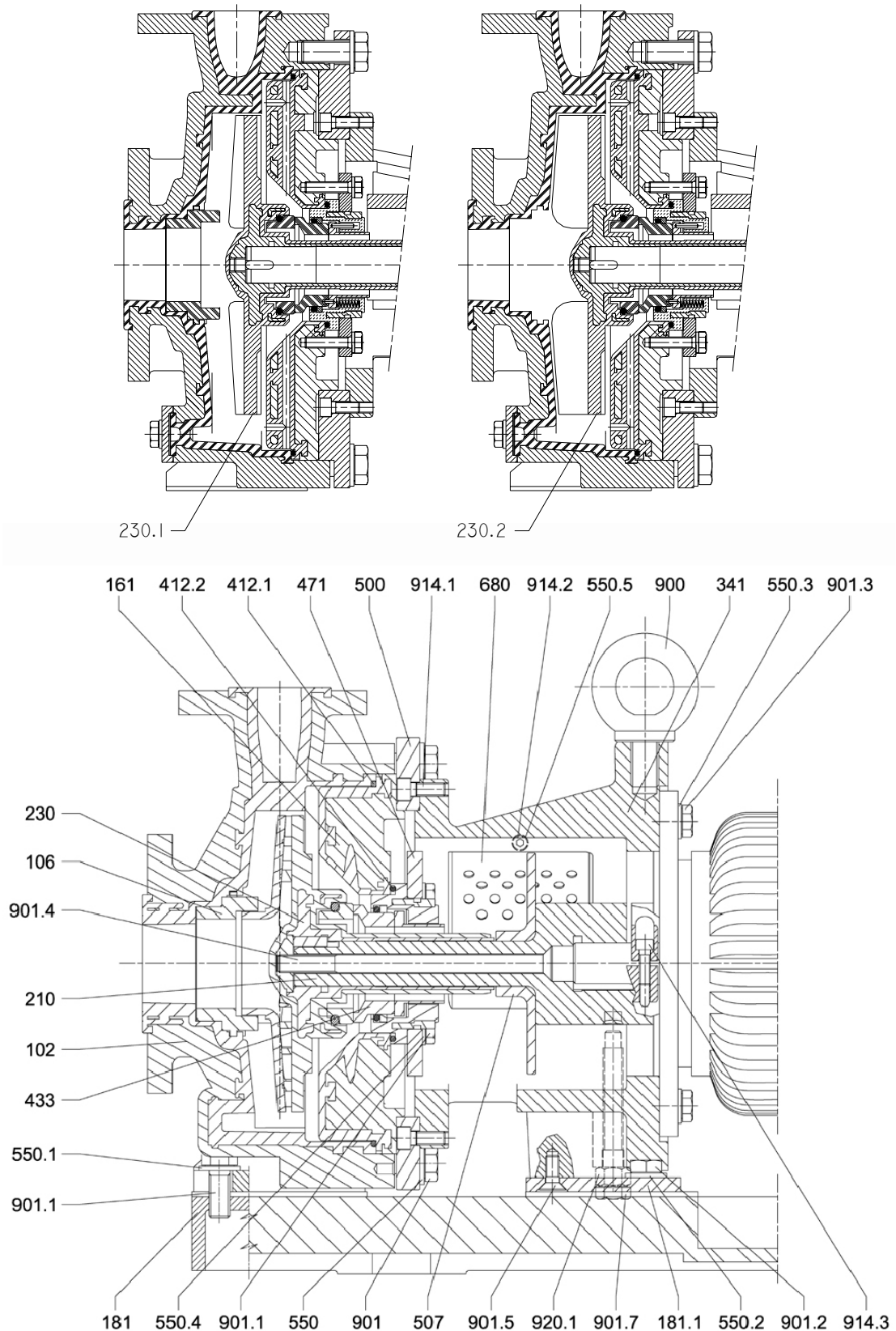


Fig. 1
UCN-BL 160 series typical section with 90 motor size and FC35 mechanical seal
Open recessed / radial impeller execution details

Code DIN	Descrizione Description	Materiale Material
102	Pump Casing	PP + GS400-12 / PFA + GS400-12
106	Wear ring	PFA
161	Stuffing Box	PP + GS400-12 / PFA + GS400-12
181	Baseplate	GS400-12
181.1	Spacer	Carbon steel
210	Shaft	Aisi 431
230	Impeller	PP / PFA
230.1	Open recessed impeller	PP / PFA
230.2	Open radial impeller	PP / PFA
341	Lantern	GS400-12
412.1	O-ring	Viton® / EPDM / Viton® -FEP
412.2	O-ring	Viton® / EPDM / Viton® -FEP
433	FC35 Mechanical seal	SIC + ETFE + Viton® / EPDM / FFKM
471	Seal flange	Aisi 304
500	Casing adaptor ring	Carbon steel
507	Splash guard	PP
550	Washer	Aisi 304
550.1	Washer	Aisi 304
550.2	Washer	Aisi 304
550.3	Washer	Aisi 304
550.4	Washer	Aisi 304
550.5	Washer	Aisi 304
680	Carter	Aisi 304
900	Lifting ring	Carbon steel
901	Screw	Aisi 304
901.1	Screw	Aisi 304
901.2	Screw	Aisi 304
901.3	Screw	Aisi 304
901.4	Screw	Aisi 304
901.5	Screw	Aisi 304
901.6	Screw	Aisi 304
901.7	Screw	Aisi 304
914.1	Screw	Aisi 304
914.2	Screw	Aisi 304
914.3	Screw	Aisi 304
920.1	Nut	Aisi 304

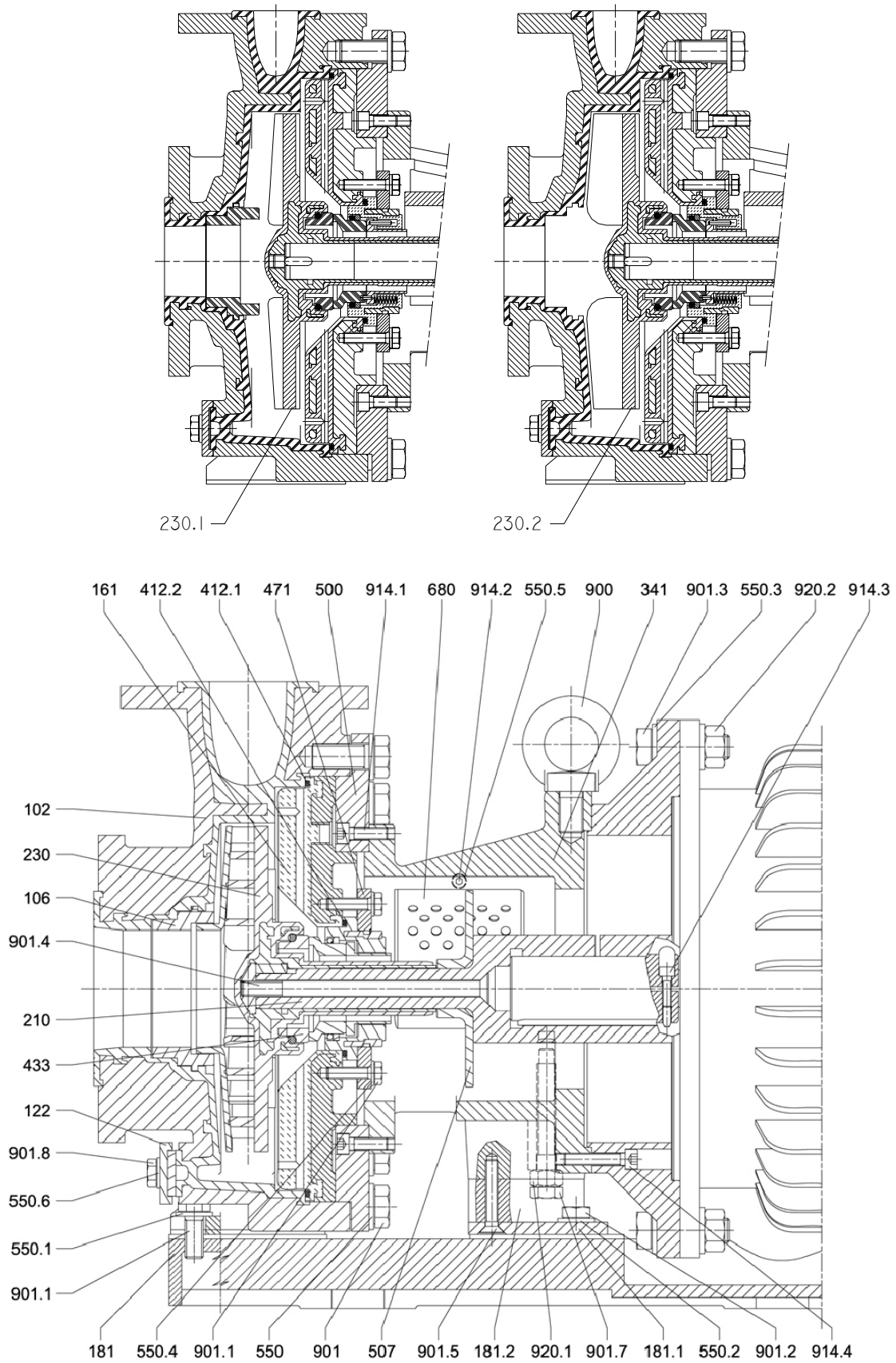


Fig. 2
UCN-BL 200 series typical section with 132/160 motor size and FC35 mechanical seal
Open recessed / radial impeller execution details

Codici DIN	Descrizione Description	Materiale Material
102	Pump Casing	PP + GS400-12 / PFA + GS400-12
106	Wear ring	PFA
122	Blind flanges	AISI 304+PTFE
161	Stuffing Box	PP + GS400-12 / PFA + GS400-12
181	Baseplate	GS400-12
181.1	Spacer	Carbon steel
181.2	Spacer	Carbon steel
210	Shaft	Aisi 431
230	Impeller	PP / PFA
230.1	Open recessed impeller	PP / PFA
230.2	Open radial impeller	PP / PFA
341	Lantern	GS400-12
412.1	O-ring	Viton® / EPDM / Viton® -FEP
412.2	O-ring	Viton® / EPDM / Viton® -FEP
433	FC35 Mechanical seal	SIC + ETFE + Viton® / EPDM / FFKM
471	Seal flange	Aisi 304
500	Casing adaptor ring	Carbon steel
507	Splash guard	PP
550	Washer	Aisi 304
550.1	Washer	Aisi 304
550.2	Washer	Aisi 304
550.3	Washer	Aisi 304
550.4	Washer	Aisi 304
550.5	Washer	Aisi 304
550.6	Washer	Aisi 304
680	Carter	Aisi 304
900	Lifting ring	Carbon steel
901	Screw	Aisi 304
901.1	Screw	Aisi 304
901.2	Screw	Aisi 304
901.3	Screw	Aisi 304
901.4	Screw	Aisi 304
901.5	Screw	Aisi 304
901.6	Screw	Aisi 304
901.7	Screw	Aisi 304
901.8	Screw	Aisi 304
914.1	Screw	Aisi 304
914.2	Screw	Aisi 304
914.3	Screw	Aisi 304
914.4	Screw	Aisi 304
920.1	Nut	Aisi 304
920.2	Nut	Aisi 304

5 Installation and assembly

5.1 General Instructions



C.D.R. Pompe S.p.A. shall not be held responsible for any damage to people or objects due to incorrect assembly performed by unqualified personnel.

Install the pump in a place where servicing can be carried out easily. The delivery and suction piping as well as the foundation work must be prepared in compliance with the dimensions shown in the overall drawing or installation plan. The diameter of the piping shall never be smaller than the suction/delivery nozzles of the pump.



Electrical parts that operate in areas in which there is a danger of explosion must comply with current regulations in force; this must be shown on the motor data plate.



Whenever there is a danger of explosion, follow the prescriptions concerning Ex protection and the test certificate.
Tale certificato deve essere conservato sul luogo di impiego della macchina.



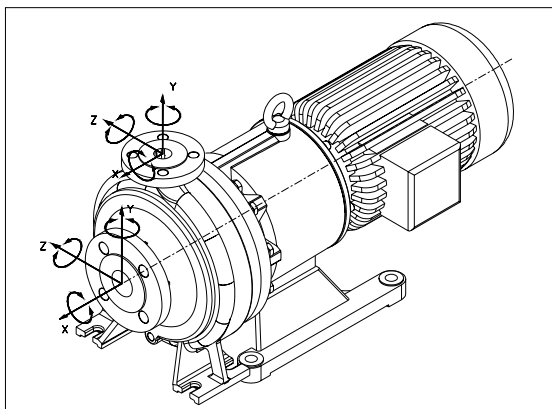
If flammable liquids are pumped, provide all pump components with proper grounding: static currents may cause sparks and explosions.

5.2 Installation

The pump-motor unit must be installed to a solid structure strong enough to support the entire area on which the unit stands.

Concrete foundations on a firm ground are the most satisfactory.

Once the pump-motor unit is in position, complete levelling by adjusting or adding metal shims placed between the feet and the surface on which it stands.



The shims must be placed in direct contact with the foundation bolts and they must be sufficiently wide to cover the largest possible surface. Check that each foot of the pump-motor unit stands steady and flat on the foundation however, this position must be set before tightening the nuts of the foundation bolts. The surface on which the foundation stands must be flat and horizontal. If the pump unit is fitted on a steel structure, make sure that it is properly supported and the feet do not bend.

CDR recommends to fit some rubber vibration-dampener between the pump and the brickwork.

The UCN-BL pump is close-coupled type thus pump-motor alignment is not required.

5.3 Plumbing

5.3.1 General Instructions

A pump is generally part of a plumbing system that can include a number of components such as valves, fittings, filters, expansion joints, instruments, etc. The way the piping is arranged and the positioning of the components have a great influence on operation and the life of your pump. The pump cannot be used as a support for the components connected to it.

All piping should be independently and properly supported. Piping should not exert any stress on the pump flanges.

Before installation, remove the pump suction and delivery protection caps.

5.3.2 Max. acceptable Stresses on flanges.



The forces and momentum transmitted to the pump by the piping system shall never exceed the values reported in the following table.

Pump flange sizes 25 / 32 / 40 / 50					
Force (N)			Torque (Nm)		
X	Y	Z	X	Y	Z
710	900	575	410	275	210

Pump flange sizes 65 / 80					
Force (N)			Torque (Nm)		
X	Y	Z	X	Y	Z
1425	1800	1160	740	500	370

The thermal expansion of pipelines requires the installation of expansion compensators. All flanges must be centred before tightening the bolts. DO NOT try to pull or straighten the piping by tightening the bolts of the flanges or threaded fittings.

The suction and delivery piping, valves or filters installed nearby must be self supported and so that no strain is discharged on the the pump.

The piping must be clean and free from debris (welding slag, chip, etc.).



The flow of liquid from and to the pump must be as even as possible.

We suggest to avoid any tight bends or drastic reductions of diameters that may cause major friction losses in the plant. In case diameter reductions are required, it is recommended to use appropriate conical reductions (possibly eccentric on suction side and concentric on discharge side) and the distance from pump flanges must be equal or more than five diameters.

5.3.3 Delivery Piping



A foot-valve and a cut-off/regulation valve are normally fitted on the discharge piping.

The foot-valve protects the pump from possible backflow. The cut-off/regulation valve excludes the pump from the line and adjusts output.

Never adjust flow-rate using the valve on the suction pipe.

5.3.4 Suction Piping

The suction piping is very important for the correct operation of your pump.

UCN-BL pumps are single-stage centrifugal type, and **non-self-priming** therefore the suction must be flooded at start up. Also, the suction line must provide sufficient pressure and smooth flow to pump inlet to prevent pump cavitation.

The suction piping must be as short and as direct as possible. Elbows, fittings or valves installed close to the suction can disrupt liquid flow and cause malfunctions. If a long suction line is needed, the diameter should be large enough to ensure low friction losses.

Air entrapment in the suction line because of leaks or improper design may cause the pump to lose prime and fail.

It is always necessary to install a foot valve in all those cases where the static height of the liquid is lower than the suction height of the pump.



The suction piping must be designed to prevent air from being trapped in high spots in the piping. This condition may cause the pump to vapour lock as the air bubble moves into the pump.

Critical points in the system could be the seals between flanges and the seals of the valve stems. **UCN-BL** pumps can become self-priming if equipped with a priming barrel (for any further information please get in touch with C.D.R. Pompe S.p.A.'s technical service).

5.3.5 Instruments

In order to ensure a reasonable control of the performance and the conditions of the pump installed, we recommend to use the following instruments:

- a vacuum gauge on the suction piping

- a pressure gauge on the delivery piping

The pressure intakes must be made on straight pieces of piping and placed at minimum five diameters from the pump inlets. The pressure gauge on delivery must always be fitted between the pump and the cut-off/regulation valve. The output can be read on the pressure, transformed into meters and then compared with the typical curves.

The electric power absorbed by the motor can be measured with watt-meters.

Optional instruments can warn about abnormal operating conditions of your pump such as: valves accidentally closed, missing liquid, overloads, etc. (for any further information please contact C.D.R. Pompe S.p.A.'s technical service). If the temperature of the pumped liquid is a critical element, provide a thermometer (best on suction).

5.4 Connecting the Motor



WARNING! Ground motor before connecting to electrical power supply. Failure to ground motor can cause severe or fatal electrical shock hazard.

Do not ground to gas supply line.

Electrical connection must always be executed by a certified electrician.

Follow the prescriptions of the local electricity board for the connection.



Never connect the electrical motors directly to mains and place, in between, a suitable electric switchboard equipped with a circuit breaker and suitable safety devices. The motor must be protected from overloads by suitable meanings.

Match voltage to nameplate voltage on motor pump! Incorrect voltage can cause fire or seriously damage motor, voiding warranty.

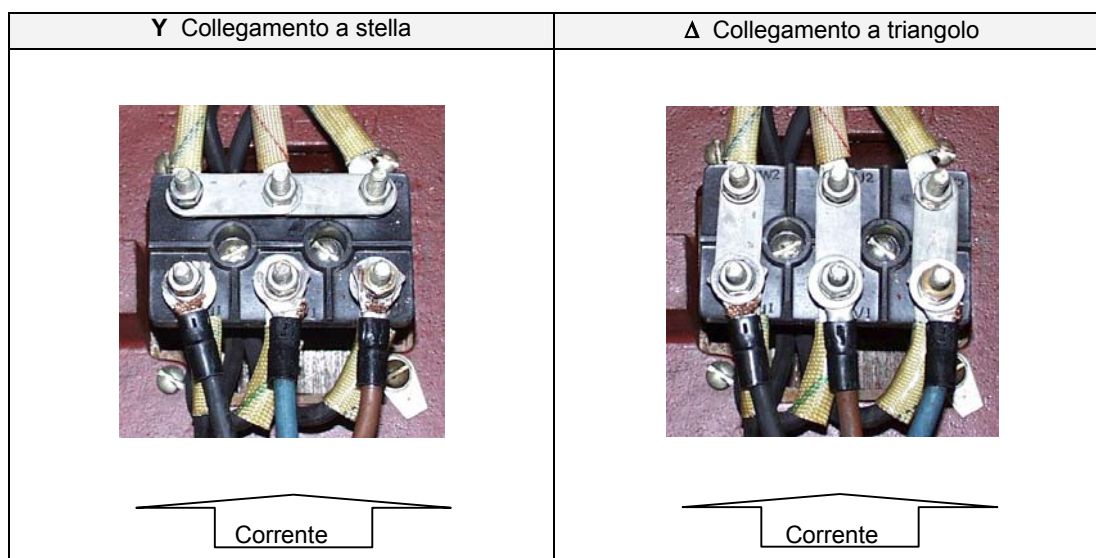
Connection is stated on the motor data plate and can be Y (star) or Δ (Delta), according to the power supply of the motor (see figure).

Before applying power to the motor, check that the motor/impeller is free to turn, by manually moving the motor cooling fan.



Always verify the motor rotation before starting regular operation.

The motor must turn in the same direction as the arrow shown on the pump lantern. The rotation however, must always be clockwise looking at the pump on the motor side.



6 operating the Pump

6.1 General Prescription


Check manually that the motor is free to turn, moving the motor cooling fan.

Make sure that the piping is not clogged and is free from residues, solid particles or crystals from the pumped product.

In case of installation on new or modified plants, it is recommended to use temporary filters (strainers, socket type) placed on the suction line.

Should the liquid to be maintained at a prescribed temperature to avoid crystallization or solidification, heat piping in accordance with the type of piping or plant needs.


Make sure that the liquid flows regularly into the pump.

 The pump and piping connected to the suction type, must be flooded. Any air or gas must be carefully released.

In case of suction with negative head, fill the suction piping and check how the bottom valve works. It must guarantee that the liquid does not flow back, emptying therefore the suction pipe with consequent un priming of the pump.

The suction cut-off valve (if any) must be completely open.

The cut-off/regulation valve on the discharge side must be almost completely closed.

 The motor must turn in the same direction as the arrow shown on the pump. The direction of rotation is always clockwise

looking at the pump on the motor side; check by starting briefly, then looking at the direction of rotation of the motor fan through the fan lid. If it is wrong, the motor must be stopped immediately. Change the connection to the terminals of the electric motor (Par. 5.4 "Motor connection") and repeat the procedure described above.


All eventual auxiliary connections must be connected and verified.

6.2 Starting the Pump

UCN-BL pumps can be started with straight electrical motor connection


Start the electric motor and open the delivery adjustment/cut-off valve gradually until the desired output has been reached.

The pump must not turn more than two or three minutes with the cut-off valve closed. A longer operation in these conditions could seriously damage your pump.

 If the pressure shown on the pressure gauge on the delivery piping does not increase, turn the pump off immediately and carefully release pressure. Repeat the connection procedure (Paragraph 5.3 "Piping connection"). If there are changes of flow-rate, head, density, temperature or viscosity of the liquid, stop the pump and get in touch with C.D.R. Pompe S.p.A.'s Technical Service.

Pumps equipped with optional heating jackets, normally used to pump liquids that solidify with low temperatures, do require extreme care at start-up. CDR strongly recommends to pre-heat your pump up to the required temperature at least 2 hours prior start-up.

6.3 Re-starting after power cut-off

 In case of accidental stopping, make sure that the non-return valve has prevented backflow and check that the motor cooling fan has stopped. Start the pump again following the instructions of paragraph 6.2 "Starting the Pump".

If the pump intakes from a lower level, it can un prime during the standstill and therefore you must check again before starting that the pump and the suction piping are full of liquid.

6.4 Stopping the Pump

Close the delivery adjustment/cut-off valve gradually and stop the motor immediately after. Make sure that the motor has an even deceleration.

Stopping the pump before closing the cut-off valve is not recommended, especially with larger pumps or long delivery piping. That is to avoid damages due to liquid backflow hammering (ram head). If a suction cut-off valve has been installed, it is advisable to close it completely.

In some applications (e.g. if the pump is used to empty tanks or tank trucks), it may occur that the liquid stops flowing into the pump while still operating. In this case the pump runs without liquid and can be seriously damaged if the condition persists. Pump must be stopped immediately. If no

automatic safety devices (optional) are installed, it is necessary to ensure the constant presence of an operator who can promptly stop the pump and perform the above-mentioned operations. Consult C.D.R. personnel to choose the proper instrument for your pump suited to prevent dry running operation.

6.5 Periods of long inactivity

6.5.1 The pump is left in place

To avoid substances settling inside the pump because of a long period of inactivity, start the pump for about five minutes periodically (about twice a month). The same applies to pumps in stand by.

6.5.2 The pump is removed and stored

If the pump has to be removed and stored, proceed according to the instructions contained in paragraphs 6.4 "Stopping the pump" and 7.1 "General Maintenance Information".

Protect the suction/delivery nozzles (use the caps supplied).

When handling the pump, follow the instructions contained in paragraph 3.2 "Pump handling" and then store the pump as described in paragraph 3.4 "Storage".

7 Maintenance

7.1 General Maintenance Information

During the warranty period, no operations must be performed other than by personnel from, or authorized in writing by C.D.R. Pompe S.p.A. All the stages described in this chapter must be carried out by qualified personnel, following all the procedures described herein, step by step.



Each service operation executed on the machine must always be carried out only after all the electrical contacts have been disconnected and make sure it cannot be started accidentally.



Before servicing any of the parts in contact with the pumped liquid, make sure that the pump has been fully emptied and thoroughly washed.



When draining the liquid make sure that the operation does not pose any danger for the people or the environment.

For **Pump Handling** procedures, please see paragraph 3.3 "Handling" on page 11.

7.2 Pump handling

The pumps/motor pumps weighing over 20 Kg must be handled and positioned using suitable hoisting means.

Always use hoisting eyebolts, when available.

The close-coupled pumps, can have unbalanced masses on the hoisting fittings, therefore transport the units with all the necessary care. While moving the parts avoid any impact that may damage the pump or the electric motor.

7.3 Pump dismantling

When dismantling the pump, please make sure that the typical drawing of your pump type are available (see typical section with FC35 mechanical seal page 13 and 15).

For different mechanical seals, please contact CDR technical department.

- Dismantling the motor with pump installed:

1. Remove the screws pos. 914.2 and the carter 680.

Locking shaft 210 with screws 901.7 (intercept shaft holes). Loose the shaft screw 914.3 through the apposite lantern hole.

For UCN-BL pumps with drive size 100/112, 132 or 160, B5 frame:

2. Loose the nuts 920.2 and remove the screws 901.3 and the washers 550.3

For UCN-BL pumps with drive size 90 B5 frame:

2. Loose the screws 901.3 and the washers 550.3



Warning! The shaft must be locked before dismantling the motor for not damage mechanical seal.

- Dismantling the wet-end with pump removed from piping:

3. Remove the screws 901 e 901.1 and washers 550 e 550.1.

Remove the casing 102 from the adapter ring 500 connected to the lantern 341.

Remove the gasket 412.1.

In order to pull out the suction cover 106 from the casing 102, pull down the tooth and turn the suction cover counter-clockwise.

4. Loosen the screws 901.4 and pull out the impeller 230, the stuffing box 161, and the splash-guard 507.



CAUTION: the static and rotating rings of the mechanical seal are usually made from very fragile, sintered material and hence must be handled with extreme care

Remove the rotating ring and O-ring of the mechanical seal 433 from the impeller.

Remove the stuffing box flange 471, loosen the screws 901.1 and washers 550.4 and pull out the seal casing and o-ring 412.2.



Do not remove the static ring from the seal! Make sure that the seal ring faces have not been damaged in any way.

7.4 Maintenance Schedule



The UCN-BL pumps have been designed and tested to run for a minimum operating time of 8000 hours assuming ideal working conditions.

This figure is conservative and can change according to the duty point of your pump -compared with the BEP on the typical curve-. Moreover, factors such as intermittent operation, type of pumped liquid, installation and location in the plant may affect the life of those components subject to wear and tear.

C.D.R. Pompe S.p.A. also recommends to perform preventive maintenance service on the pump at least once a year, even when used in ideal operating conditions.

7.5 Pump mounting

In order to assembly the pump, please repeat the same steps mentioned for the dismantling, however proceeding from the bottom up to the first steps



The static and rotating rings of the mechanical seal are usually made from very fragile, sintered material and hence must be handled with extreme care.



Fitting of the O-ring (412.1) must be made with extreme care and make sure that its sealing capabilities are not affected or compromised.

7.6 Wear Parts Check and Replacement

We suggest replacing the casing gasket, O-rings and spring cups every service job or every time the pump is opened. Mechanical Seal when it shows wear signs on the seal ring faces.

7.7 Recommended locking torque

Please refer to the following table to set proper wrench torque when locking the pump screws, bolts and nuts.

Rif. DIN	Description	Thread	Locking torque (Nm)
901.4	Impeller screw	M10	30
901	Casing screws	M12	35
		M16	60
914.1	Adapter ring screws	M8	25
914.2	Motor size 90 shaft screw	M6	10
	Motor size 100/112/132/160 shaft screw	M8	25
914.4	Lantern flange screws	M8	25
901.1	Baseplate screws	M10	30
901.2	Baseplate screws	M10	30
901.1	Mechanical seal flange screws	M8	25
901.3	Motor size 90 flange screws	M10	30
901.3	Motor size 100/112/132 flange screws	M12	35
901.3	Motor size 160 flange screws	M16	60

8 Troubleshooting

8.1 General Information

The following tables can help you to identify some possible causes for pump failures or problems you might encounter during operation. Identify on the left column of table "A" (**symptoms**) the problem encountered and read on the right column (**causes**) the reference number. Look for the probable reason for the malfunctioning and/or solution on Table "B" (Page 27). Excluding the causes not applicable to the case being examined, you can identify the source of the problem.

If the pump malfunctioning is identified with a number marked with #, we recommend to contact our after sales service for further support.



WARNING:

In compliance with the Italian law 626/94 on workplace safety, our service centre will not repair nor work on pumps and components that have not been perfectly cleaned. We regret that we shall be forced to return any pump that, in our indisputable opinion, is not sufficiently clean.

Table "A"	
Problems	Possible Causes
Pump does not have required head	1,2,3,4,9,10,11,12,14,15,17,18,19,24,29,32
Insufficient flow rate	2,3,4,5,6,7,8,9,10,11,12,14,15,17,18,29,32
Low delivery pressure	9,12,14,15,17,18,21,29
Pump unprimes after startup	2,3,4,9,10
Leaks from pump	14,19,21,23,24,25,27,33
Abnormal power absorption	13,16,17,18,21,23,24,25,26,28,30
Vibrations and unnatural noises	2,3,6,7,9,10,11,16,19,21,24,26,27,28,29,30,31,32
Bushing life too short	27,28,29,33
The pump overheats	1,6,9,13,19,20,24,26,28

Table “B”

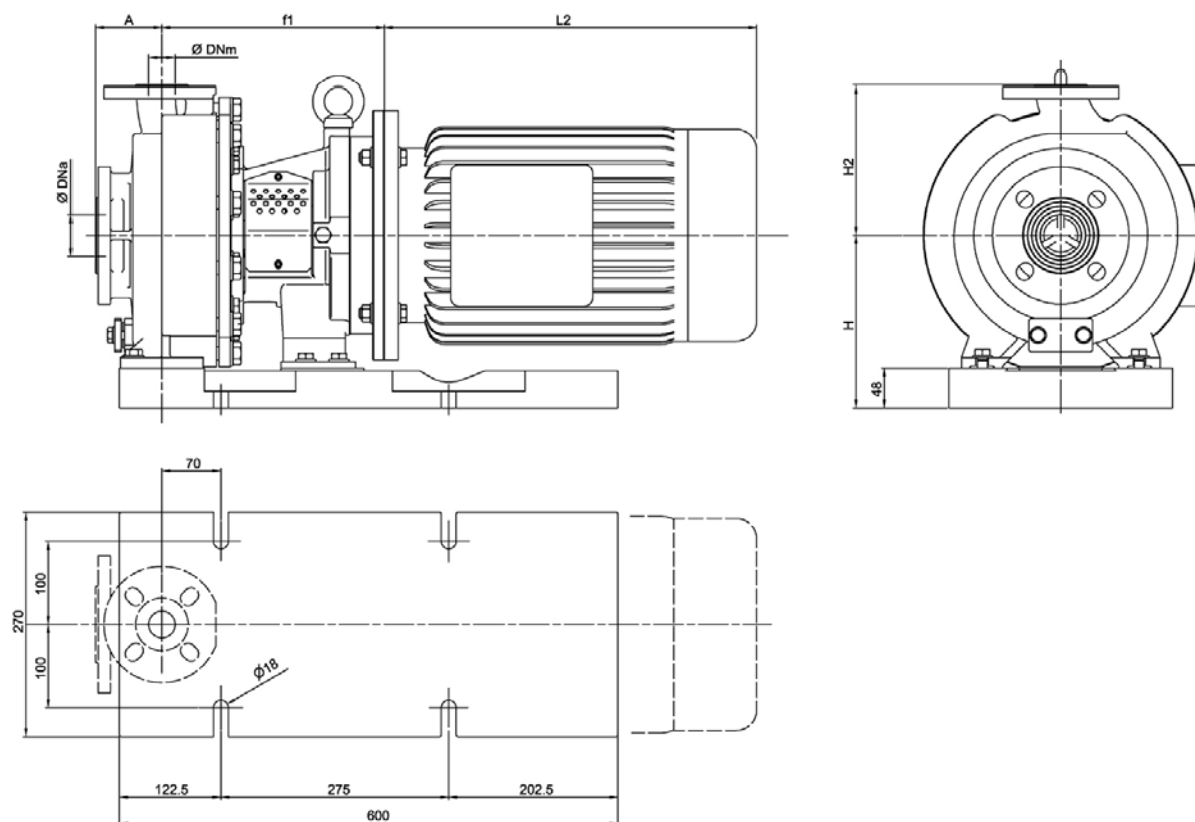
1	The Pump is not primed
2	Suction height too high
3	Suction piping or pump is not completely filled with liquid
4	Suction piping with air pockets
5	Insufficient suction pressure
6	Vapour pressure is too high
7	Suction piping has higher friction losses than calculated
8	Insufficient suction head
9	Too much air or gas in the pumped liquid
10	Suction piping not sealed
11	Foot-valve not sealed or clogged
12	Low rotation speed
13	High rotation speed
14	Wrong direction of rotation
15#	The plant total required head higher than what delivered by the pump
16	The plant total required head lower than what delivered by the pump
17#	Liquid density differs from the expected one (specified at purchase time)
18#	Liquid viscosity differs from the expected one (specified at purchase time)
19	Pump operating without liquid -dry running-
20	Operating flowrate too low
21	Operating flowrate too high -pump cavitates-
22#	Material not suitable for the pumped liquid
23#	Pumped liquid with suspended solid
24#	Liquid temperature too high
25#	Liquid temperature too low
26	Insufficient pressure or bushing lubrication/cooling (flushing flow)
27	Shaft is not straight
28	Rotating parts are rubbing against casing/isolation shell
29	Damaged impeller
30	Internal bushings worn or damaged
31	Rotating unit out of balance
32#	Magnetic coupling damaged, demagnetized or insufficient
33	Wrong assembly, dirt/solids presence, or liquid non compatible

9 Tables and Charts

9.1 Features Table

FEATURES	DESCRIPTION
Pump Model	<i>Close coupled centrifugal pump with mechanical seal</i>
Materials	PP / PFA
Pumped Liquids	<i>CORROSIVE, INFLAMMABLE AND TOXIC LIQUIDS</i>
Performances Range	Q max = 80 m ³ /h -> H max = 65 mcl
Drives	1,1 Kw (size 90) -> 18,5 Kw (size 180)
Temperature Range	0°C -> +70°C PP version -15°C -> +120°C PFA version
System Pressure Ratings	PP: max 2 Mpa (@ 20°C) to 1,2 Mpa (@ 70°C) PFA: max 2 Mpa (@ 20°C) to 0,8 Mpa (@ 120°C)
Viscosity	400 cSt max
Solids	Concentration 5% in weight Max. Hardness 800 Vk / Size 500 μ

9.2 Standard UCN-BL overall dimensions



Pump type	Dna	DNm	A	H	H2
	Suction flange	Delivery flange			
	Holes for: UNI 2223/29 PN16 ANSI B16,5 150 RF	Holes for: UNI 2223/29 PN16 ANSI B16,5 150 RF			
UCN-BL 40-25-160	40	25	80	180	160
UCN-BL 50-32-160	50	32	80	180	160
UCN-BL 50-32-200	50	32	80	208	180
UCN-BL 65-40-160	65	40	80	180	160
UCN-BL 65-40-200	65	40	100	208	180
UCN-BL 80-50-125	80	50	100	180*	160
UCN-BL 80-50-200	80	50	100	208	200

*H=208 for UCN-BL 80-50-125 motor size 160

Pump type

Motor size - frame		f1	Overall dimensions	
			TEFC	Eex
			L2	L2
90	B5	221,5	256	336
100	B5	235	314	366
112	B5	235	323	415
132	B5	265	400	503
160	B5	280	494	595

Pump type	Pump weight (Kg)
UCN-BL 40-25-160	40
UCN-BL 50-32-160	45
UCN-BL 50-32-200	75
UCN-BL 65-40-160	50
UCN-BL 65-40-200	80
UCN-BL 80-50-125	50
UCN-BL 80-50-200	85

Motor weight (Kg)

TEFC			Eex		
Motor size	Frame	Weight	Motor size	Frame	Weight
90	B5	20	90	B5	30
100	B5	36	100	B5	40
112	B5	45	112	B5	65
132	B5	70	132	B5	80
160	B5	100	160	B5	110

[illegible]

[illegible]

Tech-Books and User Manuals



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